THE NATIONAL ALLOWANCE DATA BASE
VERSION 3.2
TECHNICAL SUPPORT DOCUMENT

Prepared for:

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NOTICES

This document has been prepared for the Clean Air Markets Division, Office of Atmospheric Programs, U.S. Environmental Protection Agency by T. Larry Montgomery and Susy S. Rothschild. The document has been reviewed and approved for public distribution by the Clean Air Markets Division.

CONTENTS

ABBREVIATIONS AND ACRONYMS

Btu	--British thermal unit
CAA	--Clean Air Act
DOE	--U.S. Department of Energy
EIA	--Energy Information Administration
EPA	--U.S. Environmental Protection Agency
FERC	--Federal Energy Regulatory Commission
FPC	--Federal Power Commission
FR	--*Federal Register*
GWh	--Gigawatt-hour
IDBS	--Integrated Data Base System
kWh	--Kilowatt-hour
kVA	--Kilovolt-amperes
lbs	--Pounds
MMBtu	--Million Btu
MW	--Megawatt
NADB	--National Allowance Data Base
NAPAP	--National Acid Precipitation Assessment Program
NEDS	--National Emissions Data System
NSPS	--New Source Performance Standards
NURF	--National Utility Reference File
OAQPS	--Office of Air Quality Planning and Standards
ORIS	--Office of Regulatory Information Systems
PC	--Personal (micro) Computer
Pechan	--E.H. Pechan & Associates
SAS	--Statistical Analysis System
SIP	--State Implementation Plan
SO_2	--Sulfur dioxide

ACKNOWLEDGEMENTS

This report is an update to the National Allowance Data Base Version 3.11 that was prepared by E.H. Pechan & Associates, Inc. for the U.S. Environmental Protection Agency. Because of this, a significant amount of the material that was included in the Version 3.11 report is also included in this report. Therefore, this report could not have been prepared without this valuable input from E.H. Pechan & Associates, Inc., and their significant contributions are acknowledged.

SECTION 1
INTRODUCTION

The U.S. Environmental Protection Agency (EPA) began efforts in 1989 to create a data base containing the necessary data elements on utility combustion sources to support a market based system of acid rain controls. The EPA chose the 1985 National Utility Reference File (NURF) data, augmented by the U.S. Department of Energy's (DOE) Energy Information Administration (EIA) data, as the starting point for the development of the National Allowance Data Base (NADB). The NADB was utilized for calculating sulfur dioxide (SO_2) emission allowances or credits, as delineated by the Acid Deposition Control Title IV of the Clean Air Act (CAA) (PL, 1990).

The NADB has undergone several stages of careful review: by the EPA regions in summer 1990, prior to the release of Version 1.0; by EPA, during fall 1990 and spring 1991, which was followed by the release of Version 2.0; by the electric utilities, during a 45-day public review during summer 1991, which resulted in Version 2.1; and again by the utilities during a 60-day public review during summer 1992, culminating in the release of Version 2.11. The NADB Version 3.11 (NADBV311) was an adaptation of Version 2.11 (NADBV211) in which records were aggregated to the **boiler** level and data were treated accordingly. Versions 2.11 and 3.11 of the NADB were associated with the initial allocation of Acid Rain Program allowances in 1993.

In accordance with the Clean Air Act Amendments of 1990 (PL 1990), the Acid Rain Program allowances were re-allocated in 1998. In order to complete the 1998 re-allocation of allowances, the NADB was updated with minor revisions to Version 2.2 (Pechan 1996). This version of the NADB (Version 3.2) is the boiler level adaptation of version 2.2 in which the records are aggregated to the **boiler** level.

This document provides a description of how the NADB was developed and what its key data elements are. Those interested primarily in understanding how the data were assembled should read Section 2, which describes the development of the NADB. Specific information about each of the data elements is contained in Section 3. The variables in this NADB Version 3.2 data base (NADBV32) are from those data elements in the NADBV22 which are fully described in the Technical Document for Version 2.2 (Pechan, 1996).

SECTION 2
NATIONAL ALLOWANCE DATA BASE

The NADB contains data for utility units, namely "fossil-fired combustion devices," as defined in section 402 of the CAA. **The NADB does not necessarily encompass all affected units (although it includes all units known to be affected as of September 8, 1992), and all units in the NADB are not necessarily affected units.**

The origin of the NADB is the 1985 NURF (EPA, 1985). data were gathered from the sources listed below:

- The 1985 National Emissions Data System (NEDS) submittals, which served as the basis for the 1985 National Assessment Program (NAPAP) Emissions Inventory.
- Form EIA-767 (EIA, 1982-1989) and Form EIA-67 (FPC, 1980-1981).
- Form EIA-759 (EIA, 1980-1989).
- The Federal Energy Regulatory Commission (FERC) Form FERC-423 (FERC, 1985-1989).
- The EIA Integrated Data Base System (IDBS), which consists of Form EIA-860 (EIA, 1989a) and Form EIA-861 (EIA, 1989b).

For further information on the NURF, see the NURF documentation (EPA, 1989). For further information on the NADB, see the NADB Version 2.11 Technical Support Document (Pechan, 1993); the NADB Version 3.11 Technical Support Document (Pechan, 1995); and the NADB Version 2.2 Technical Support Document (Pechan, 1996).

In July 1990, the data for each plant were submitted to the 10 EPA regions for review of the following key elements: 1985 SO_2 emissions and emission rate, 1985 total heat input, and 1985 SO_2 emission limits and associated variables. Responses from the regions and the utilities were compiled and acted upon through October 3, 1990. The result was the NADB Version 1.0, a file with 2,456 generating unit records and 36 variables or data elements. Version 1.0 was disseminated to the public, evoking further responses.

Upon checking the revised data submittals, inconsistencies

among specified variables were discerned. In order to verify these values and eliminate inconsistencies whenever possible, sources were contacted and asked to clarify and document these data values. A concerted effort was made to revise the data base and incorporate any documented information that could be obtained. In addition, the occurrences of multi-header units in which there was not a 1-to-1 correspondence between boilers and generators was considered. This was addressed by including a data base record for each boiler-generator combination within a plant.

The above changes lead to the NADB Version 2.0, which was produced in June 1991. It contained boiler-generator data on fossil-fuel steam generators of all sizes that were reported to be in operation by 1990, or planned to soon be operational, in the 48 contiguous States and the District of Columbia. Also included were reported data for simple combustion turbine and combined cycle units planned for construction through 1995. The file included 3,732 boiler-generator records, each containing 36 variables.

The NADB Version 2.0 was offered by EPA for public review (FR, 1991) during a 45-day comment period commencing on July 19, 1991. For further information, see the NADB Version 2.0 Technical Support Document (Pechan, 1991). After the close of the comment period on September 3, 1991, the Data Change Forms and associated documentation submittal to the EPA Docket were reviewed by EPA (and EIA when appropriate). Determinations were made regarding acceptance of suggested changes to the data base. Responses to all the requested changes were submitted to the Docket by EPA for public review. Changes were made to the data base, resulting in the NADB Version 2.1. Reported data for simple combustion turbine and combined cycle units planned for construction through 2006 were also included in this revised data base.

The NADB Version 2.1 was then subject to public review (FR, 1992) during a 60-day comment period initiated by EPA on July 7, 1992. Subsequent to the September 8, 1992 close of the comment period, the documents submitted to the two EPA Dockets were reviewed by EPA. Following the completion and implementation of the changes to the data base, the Acid Rain Program Core Rules were promulgated in January 1993 (FR, 1993a), the NADB Technical Support Document was updated to Version 2.11 in March 1993 (Pechan, 1993), and the NADB Version 2.11 was also released in March 1993 along with the Final SO_2 Allowance Allocation Regulations (FR, 1993b).

Because many other data bases, as well as regulations, are

based on boiler-level data, the creation of the boiler-level NADB--the NADB Version 3.11--was deemed necessary by EPA. Thus, boiler-generator based data were aggregated to the boiler level, while data that were at the utility, plant, and boiler level remained the same. The data that were generator based also remained unchanged, *except for those units that were multi-headered* (units for which there was more than one generator for a given boiler). In these multi-headered situations, there would be more than one value for 10 variables (generator ID, nameplate capacity, summer net dependable capability, generator month and year on-line, outage hours, heat rate, generation, heat input at 60 percent capacity, and boiler-generator NADBV211 sequence number. In order to maintain these data, string variables were developed for these 10 variables to include the values from *all* the generators associated with the boiler. If there was a 1-to-1 correspondence between boiler and generator, these string variables would contain only the single generator's data (as a character variable); if there were multiple generators for a boiler, the string variables would contain all the generator's values for the variable, with each value separated by a comma.

The NADB Version 3.11 was made available in dBASE III Plus PC format, as well as on the IBM mainframe in Statistical Analysis (SAS) format. Because the string variables added to the data base were allocated substantial length to account for the maximum number of generators associated with a single boiler, the NADBV311 was split into two parts: (1) the NADB311**B** ("B" for boiler) and (2) the NADB311**S** ("S" for strings).

The NADB Version 3.11 included 48 variables--38 in the NADB311B and 14 in the NADB311S, 4 of which are in both files. Represented in this data base are 2,913 boilers from 958 plants (127 of which have records with multiple boiler-generator combinations) and 330 operating utilities. The data are sorted by State name, plant name, and boiler ID, and then assigned a unique boiler sequence number.

Finally, this report is for the NADB Version 3.2 (NADBV32) which was developed as a result of the need to re-allocate the Acid Rain Program Allowances in 1998 as required by the 1990 Clean Air Act (PL, 1990). For this re-allocation process, Version 2.2 of the NADB (NADBV22) was produced in 1996 (Pechan, 1996). This NADB Version 3.2 (NADBV32) is the boiler based version similar to NADB Version 3.11 described above. It has been derived from NADB Version 2.2 (NADBV22) similar to the NADBV311 derivation described above.

SECTION 3
DESCRIPTION OF DATA ELEMENTS

The NADB Version 3.2, separated into 2 data files, NADB32B and NADB32S, contains 48 data elements that have been split into two files of 38 and 14 variables. (4 identical identification variables appear in both files). Table 1 lists the NADB32B variables and Table 2 lists the NADB32S variables.

THE NADB32B FILE

Descriptions of the 38 variables in the NADB32B file are provided below.

1. **Boiler Sequence Number (BLRSEQ)** --
   The boiler records in this data base, NADB Version 3.2, have the same BLRSEQ numbers that were contained in NADB Version 3.11 when the NADB 3.11 boilers were sorted by State name, plant name, and boiler ID and assigned a unique sequential number from 1 to 2,913. This NADBV32 is still sorted by BLRSEQ although some state names, plant names, and boiler ID's, among other data elements, have been updated.

2. **State Name (STATNAM)** --
   This field, from Form EIA-860, contains the name of the State where the plant is located. Two changes have been made since the NADBV311 was published.

3. **Plant Name (PNAME)** --
   The name associated with each plant, as reported on Form EIA-860, is contained in this field. PNAMEs for planned units with identical names ("NA") but different ORIS plant codes (ORISPL) were modified by appending the ORISPL in order to uniquely identify the plants. Names changed since the NADBV311 was published have been updated.

4. **Boiler Identification Code (BLRID)** --
   This right-justified character code identifies the boiler (in the fossil-fuel steam unit case) or gas- or oil-burning turbine (in the new simple combustion turbine case). In the majority of cases, there is a 1-to-1 correspondence with generator ID. The source of the boiler identification code is Form EIA-767 or a report

from the utility (if there was no Form EIA-767 filled out). If small, planned, or other units do not have an assigned boiler code, a default value of two asterisks followed by the GENID is used. BLRIDs changed after the NADB311 was published have been updated.

5. **Number of Associated Generators (NUMGEN)** --
The number of generators associated with the boiler is reported in this field. No changes have occurred in this variable since the publication of NADBV311.

6. **Operating Utility Name (UTILNAME)** --
There is a utility name for every utility; this name will be different from that in the 1985 NURF if the name or operator changed between 1985 and 1989. The source of the data is Form EIA-861. For the eight utilities with duplicate names, the State postal code was appended to the utility name to ensure uniqueness. Changes since publication of the NADBV311 have been included.

7. **Operating Utility Code (UCODE)** --
Each operating utility has a unique utility code, originating from Form EIA-861. This field, associated with UTILNAME, also reflects the 1989 status. Changes occurring after publication of the NADBV311 have been included.

8. **EPA Region (EPARGN)** --
This field contains the number of the EPA region in which the plant is located. Two changes have been made since the NADBV311 was published.

9. **County name (CNTYNAME)** --
The county name is obtained from Form EIA-860. For planned units whose exact location is unknown, the CNTYNAME is "NOT IN FILE". One change has been made since the NADBV311 was published.

10. **DOE (ORIS) Plant Code (ORISPL)** --
This plant code was originally developed for utility plants by the Office of the Regulatory information Systems (ORIS), which was a part of the Federal Power Commission (FPC). It is now used as a unique plant identification code assigned by EIA. Changes occurring after publication of the NADBV311 have been included.

11. **Total Phase 1 Allowances (TOTALPH1)** --
This field contains the total basic Phase 1 allowances, in tons, for units that appear in Table A of the CAA (with multi-header situations taken into account). The allowances in Table A, originally on the generator-level, were reallocated to the boiler-level and then adjusted for certain units that receive additional allowances under sections 404(a)(3) and 404(h) of the CAA. These total values are equal to the sum of Column A and Column B published in Table 1 of section 73.10(a) in the *Federal Register* (FR, 1993a). Therefore, these total values do not reflect subsequent deductions of allowances required under section 416 of the CAA to create the "auction and sales" allowance reserves that are published in Table 1, Column B described above. No changes have occurred in this variable since the publication of NADBV311.

12. **1985 Boiler Total Heat Input (TOTHT)** --
Total heat input, in 10^{12} Btu, is the sum of the products of the amount of each fuel consumed and the associated heat content. These data, from the 1985 NURF, reflect 1985 values only. No changes have occurred in this variable since the publication of NADBV311.

13. **1985 Boiler SO_2 emissions (SO_2)** --
This field contains SO_2 emissions, in tons, from the 1985 NURF. No changes have occurred in this variable since the publication of NADBV311.

14. **Boiler SO_2 Regulatory Category (SO2CATEG)** --
The regulatory category determines the type of emission regulation the unit must meet. The plant may be regulated under one of the following:
    - The State Implementation Plan (SIP), meaning that State or local regulations are binding (=1);
    - The new Source Performance Standards (NSPS), 40 CFR, Part 60, Subpart D (=2);
    - The revised NSPS (RNSPS), 40 CFR, Part 60, Subpart Da (=3);
    - The NSPS, 40 CFR, part 60, Subpart GG (=4);
    - The SIP for the existing gas turbine, combined cycle with auxiliary firing (=6); or
    - The NSPS, 40 CFR, Part 60, Subpart GG for the existing gas turbine, combined cycle, with auxiliary firing (=9).

- For units with no information, SO2CATEG=0.

The source of these data is EPA's Office of Air Quality Planning and Standards (OAQPS) preliminary SIP limit data base. These data were updated based on information and documentation provided by utilities, as well as Federal, State, and local regulatory agencies. No changes have occurred in this variable since the publication of NADBV311.

15. **Boiler SO_2 Scrubber Flag (SCRUBBER)** --
This field indicates whether the boiler was scrubbed (=1) or unscrubbed (=0). Scrubber information was obtained from EIA (EIA, 1985) and updated. Information is provided for planned units to the extent available. For planned units for which no information was available, SCRUBBER=9. Units that showed a zero percent SO_2 removal efficiency were assumed to be unscrubbed. No changes have occurred in this variable since the publication of NADBV311.

16. **1985 Boiler SO_2 Emission Limit (FELIM85)** --
This field is the federally enforceable SO_2 emission limit (rounded to four decimal places) that applied to each boiler in 1985; it has been converted to pounds of SO_2 per million Btu of heat input (lbs/MMBtu). For units with more than one limit, the most stringent federally enforceable limit is used. For newer units subject to NSPS, and those that came on-line after 1985, the federally permitted limit is used. For units with no federally enforceable limit or units not yet permitted, a code of 99.9 is used. The source of these data is the EPA OAQPS preliminary SIP limit data base. These data were updated based on information and documentation provided by utilities, as well as Federal, State, and local regulatory agencies. No changes have occurred in this variable since the publication of NADBV311.

17. **1985 SO2 Emission Limit Annualization Factor (ANNFACT)** --
This field is the annualization factor that, when multiplied by the SO_2 emissions limit (FELIM85), produces the annualized SO_2 emission limit (ANNLIM85). No changes have occurred in this variable since the publication of NADBV311.

18. **1985 SO2 Emission Limit Averaging Period (AVGPD)** --

This field contains 1 of 17 codes indicating the averaging period or time over which the emission limit, FELIM85, is applied. The source of these data is the OAQPS preliminary SIP limit data base. These data were updated based on information and documentation provided by utilities, as well as Federal, State, and local regulatory agencies. No changes have occurred in this variable since the publication of NADBV311.

19. **First Generator 1989 Nameplate Capacity(NAMEPCAP)** -- This field contains the 1989 nameplate capacity of the first existing (or planned) generator, in MW and rounded to two decimal places. Form EIA-860 generally is the source of this value. If the nameplate rating is expressed in kilovolt-amperes (kVA), the translation to MW is made by using the formula:

$$MW = kVA * power\ factor / 10^3$$

where kVA and power factor are specified by the manufacturer and stamped on the physical nameplate attached to the generator. For combined cycle units with auxiliary firing, the gas turbine MW and steam generating unit MW are combined for the nameplate capacity value. For planned units, the NAMEPCAP value represents the planned nameplate capacity as reported on Form EIA-860. One variable value has changed since NADBV311 publication.

20. **First Generator 1989 Summer net Dependable Capability (SUMNDCAP)** -- This field contains the 1989 summer net dependable capability of the first existing generator, in MW and is rounded to two decimal places. The source of this data element is Form EIA-860. For combined cycle units with auxiliary firing, the gas turbine MW and steam generating MW are combined for the summer net dependable capability value. For planned units, the SUMNDCAP value represents the planned summer net dependable capability as reported on Form EIA-860.

Units built to produce both electricity and steam for sale may have more steam (boiler) capability than electric (generator) capability. For the generating units that have significant extra boiler capacity and sell steam, individual multipliers were developed to adjust boiler

capability in terms of generator summer capability (kilowatts-electric).

If a value is not available, the default value is NAMEPCAP. For units coming on-line after 1990, which may not yet have established a reliable value for summer net dependable capability, the capability was determined form the following formula:

*SUMNDCAP=NAMEPCAP*factor*,

where *factor* varies (EIA, 1990a) based on the type of unit as described below:

Unit Type	Factor
Combined Cycle	.85
Combustion Turbine	.85
Steam Turbine	.94
Jet Engine	.87
Internal Combustion	.97

One variable value has changed since NADBV311 publication.

21. **First Generator Month On-line (GENMNONL)** --
This data value, from Form EIA-860, is the month portion of the first generator start-up date. For existing units, this is the first electricity date (viz, the date when the unit begins to produce electricity, including electricity generated during a testing period). For units that have been re-powered, it is the re-powered generator first electricity date. For planned units, it is the projected first electricity date. These data have not been updated since NADBV311 publication.

22. **First Generator Year On-line (GENYRONL)** --
This data value, from Form EIA-860, is the year portion of the first generator on-line date. See GENMNONL for further details. These data have not been updated since NADBV311 publication.

23. **Boiler Month On-line (BLRMNONL)** --
Although the term "commenced commercial operation" is defined as having "begun to generate electricity for sale,

including the sale of test generation" (FR, 1993b), the generation of electricity occurs at the generator, thus potentially creating difficulty in determining the boiler on-line date that is used to categorize affected units for Phase II allowance allocations. Therefore, the following guidelines were compiled with to determine boiler on-line dates:

The boiler on-line month is the month portion of the boiler on-line date.

For units from plants of at least 100 MW and with a generator first electricity on-line date between 1984 and 1989, the boiler on-line date is the generator first positive generation date (viz, the date when both the boiler first consumes fuel and the associated generator first produces generation).

For units with a generator first electricity on-line date prior to 1984 or from plants with less than 100 MW, the boiler on-line date is the generator first electricity date.

For units with on-line dates of 1990 and beyond, the boiler on-line date was the projected generator first electricity date at the time of NADBV311 development.

If the boiler on-line dates are different for multiple boilers that are feeding one generator, the earliest of the boiler on-line dates is used for all the boilers feeding that generator, unless the boiler was new or replaced.

If the boiler is new or was replaced, the date of the boiler's first consumption of fuel, or the date of commercial operation of the new boiler, as reported to EIA, was used. These data have been updated since NADBV311 publication when necessary for correct allocation of allowances.

24. **Boiler Year On-line (BLRYRONL)** --
The boiler on-line year is the year portion of the boiler on-line date. See BLRMNONL for further details. These data have been updated since NADBV311 publication when necessary for correct allocation of allowances.

25. **1985-1987 Boiler-generator Average Total Heat Input, "Baseline" (BASE8587)** --
The average total heat input (also called "baseline"), in 10^{12} Btu, is the arithmetic mean of the calculated heat inputs for all 1985 through 1987 from Form EIA-767 reported fuels.

For steam units with no 1985 Form EIA-767 data (in plants under 100 MW), data are obtained elsewhere. The 1985 fuel use data are apportioned, based on MW, from Form EIA-759 plant-level data. The associated 1985 heat content is determined from the average of the 1986 and 1987 Form EIA-767 heat contents. If no heat content was reported on Form EIA-767 for either 1986 or 1987, the appropriate average State heat content (computed for each fuel reported by all plants in that State on Form EIA-767 from 1985 through 1987) is used as the default value.

For units with OUTAGEHR=26,280 (the entire 1985 to 1987 baseline time period), the value for BASE8587 is an alternative representative baseline value assigned by EPA to correspond to 1 hour of fuel usage, as authorized by section 402(4)(a) of the CAA. In this case, the value for OUTAGEHR is correspondingly changed to 26,279 (to avoid division by zero when calculating the adjusted baseline used for the allowance calculations).

For multi-header units, there is a unique value for each boiler-generator, obtained by apportioning the boiler based Form EIA-767 fuel data to each generator, depending upon its fractional share of the total generation (or, if that is not reported, the nameplate capacity) associated with the boiler. When Form EIA-759 plant-level data are used, the data are first apportioned to each generator, depending upon its fractional share of the plant's fossil-fuel nameplate capacity. If there are multiple boilers feeding one generator, the data are divided equally among all the boilers connected to the multi-headered generator.

For combined cycle units with auxiliary firing, all fuel consumed (including fuel from auxiliary boilers, duct heat, or scrubber reheat) is included.

For gas turbines, fuel data were obtained from Form EIA-759 whenever possible. Otherwise, the information was

obtained from the utilities.

If there was no fuel consumption for all 3 years, the baseline value is 0.

These data have not changed since the publication of NADB311. However, some values were changed in the sixth decimal place to correct rounding errors in the NADBV311 PC version of the data base.

Note that outage hours do not affect the numerical value contained in this field. This baseline value is therefore not adjusted for either outage hours or for units that came on-line during the 1985 to 1987 time period.

26. **Boiler Consecutive Planned and Forced Outage Hours (BLROUTAGE)** --
This field represents the number of continuous hours a boiler was out of service between 1985-1987 due to a planned or forced outage for non-routine maintenance or for specified outage classifications accepted by EPA. The following list contains the outage classifications that were accepted by EPA.

- Forced/planned non-routine maintenance and accidents, longer than or equal to 4 months.
- Outages of 3 months or longer caused by accidents.
- Discontinuous but related outages for forced/planned non-routine maintenance, where total duration was 4 months or longer.
- Discontinuous but related outages for accidents, where total duration was 3 months or longer.
- Outages of 4 months or longer, which were not caused by forced/planned non-routine maintenance or accidents, in which the unit's emission rate is less than 1.2 lbs/MMBtu and the allowance impact by not providing allowances to the operating utility is severe.

If there were individual unrelated outages each totaling less than 4 months (2,920 hours) during the period from 1985 to 1987, the value of BLROUTAGE is 0.

One value has changed since the NADBV311 was published.

27. **Primary Fuel Indicator (PRIMFUEL)** --

This field, for those units with fuel use, has a value of 1 if the coal heat content is greater than 50 percent of the total heat input for the years 1985 through 1987, and a value of 2 otherwise (for oil/gas units). For those units which did not report any fuel use on Form EIA-767 for those years (generally, if the steam unit was on standby or out of service, if the unit was part of a plant under 10 MW in size, or if it is not a steam plant), the Form EIA-860 generator primary fuel variable is used to determine the value of PRIMFUEL (the value is set at 1 if the primary fuel was reported as coal, and is set as 2 otherwise). No changes have occurred in this variable since the publication of NADBV311.

28. **1980-1989 Gas Share (GAS8989)** --
This value, calculated from 1980 through 1989 Form EIA-767 data for oil/gas units on-line during the period from 1985 to 1987, is the percentage of gas consumed by each boiler during this time period. The equation used is:
GAS8089=100(1980-1989 gas heat input)/(1980-1989 total heat input)*.

For units in plants under 100 MW which did not report fuel use prior to 1986, Form EIA-767 data from the 1986 to 1989 time period are used. This field is calculated at the boiler level from Form EIA-767 data for boilers in plants that were identified, using Form EIA-759, as consuming more than 75 percent gas between 1980 and 1989. For those boilers in plants not so identified, plant-level data from Form EIA-759 are used. The value is 0 for coal units (those with a greater than 50 percent coal share) on-line during the period from 1985 to 1987. No changes have occurred in this variable since the publication of NADBV311.

29. **First Generator 1989 Heat Rate (HEATRATE)** --

The first generator heat rate value, in Btu/kWh, is the net full load heat rate reported for the first generator on Form EIA-860. To ensure that estimated heat rates fell within a reasonable range of 5,000 to 25,000, contacts were made to confirm values that were outside that range. The higher values outside the range were either revised downward or were left alone, since they were reported for very old and inefficient units. A default value for fossil-fuel steam units is used if values of 5,000 or less (mostly in retired or planned units) were reported, or if no data were available. This default value of 10,000 is based on typical heat rates for new fossil-fuel-fired units that range between 7,260 (efficiency of 47 percent) and 13,648 (efficiency of 25 percent) (EIA, 1990b). For planned simple combustion turbine and combined cycle units, heat rate defaults of 13,648 and 8,322, respectively, were used (EIA, 1990b). No changes have occurred in this variable since the publication of NADBV311.

30. **First Generator 1985 Generation (GENER)** --
Whenever possible first generator generation for 1985, in GWh, is obtained from Form EIA-767. Generator-level generation data are not available for units in plants under 100 MW and for units whose utilities did not report individual generator generation. In these cases, the data are apportioned, by MW, from Form EIA-759 plant-level data. For existing combined cycle units with auxiliary firing, the gas turbine generation and the steam generation unit generation are combined for the generator generation value. For units not operating in 1985, the generation value is 0. No changes have occurred in this variable since the publication of NADBV311.

31. **Total Capacity of the Fossil-steam Units of the Operating utility (UCAPFSST)** --
This field is the sum, in MW, to the nearest integer, of the Form EIA-860 reported 1989 nameplate capacity of all the fossil-fuel steam units operated by the operating utility of the particular unit in 1989. In a few cases, this value is 0 because all of the utility's units retired before 1989 or had not come on-line by 1989. In addition, if the operated capacity was less than 0.5 MW, this field value is 0. As a result of litigation, three utilities have had this data element modified for NADB Version 3.2

(23 values were changed).

32. **Maximum of the Average Heat Inputs for any Combination of Three Consecutive Years from 1980-1989 (MXBS8089)** -- This heat input data element (also called "maximum baseline"), in 10^{12} Btu, is the maximum of the average heat inputs for every combination of 3 consecutive years reported on Form EIA-767 between 1980 and 1989. It is calculated similarly to BASE8587, but only for units subject to section 405(i) of Title IV of the CAA; the value is 0 otherwise. No changes have occurred in this variable since the publication of NADBV311.

33. **Representative Year SO_2 Emission Rate (RY_ER)** -- The representative year SO_2 emission rate, in lbs/MMBtu and rounded to four decimal places is nonzero only for those cases in which there is a positive baseline (either BASE8587 or MXBS8089) value, but no 1985 SO_2 emission rate.

    This field is assigned the 1985 (or 1986 or 1987) SO_2 emission rate calculated from EIA data. The EIA emission rate is calculated using Form EIA-767 fuel quantity and quality data, EPA's AP-42 emission factors (EPA, 1985), and the SO_2 control efficiency.

    If a unit has a positive baseline value, an SO2RTE value of 0, all EIA emission rates calculated to be 0, and is more than 90 percent gas for either the 1980 to 1989 (GAS8089>90) or the 1985 time period, then this field is assigned a default value of 0.0006, based on the AP-42 factor for natural gas. During the comment period, a utility may have requested the use of an alternate year's rate; if such a rate is necessary for allowance calculations and was approved, it was included.

    No changes have occurred in this variable since the publication of NADBV311.

34. **Municipally Operated Flag (FLAGMUNI)** -- If an operating utility was a municipal utility as of December 1989, this field has a value of 1, and 0 otherwise. The source of this data element was Form EIA-861. No changes have occurred in this variable since the

publication of NADBV311.

35. **1985 Boiler SO_2 Emission Rate (SO2RTE)** --
The actual SO_2 emission rate, in lbs/MMBtu and rounded to four decimal places, is calculated from the boiler SO_2 emissions (tons) in 1985 and the boiler total heat input of fuels burned (10^{12} Btu) in 1985. The equation used is":

*SO2RTE=(2*SO2)/1000*TOTHT)*.

No changes have occurred in this variable since the publication of NADBV311.

36. **1985 Annualized Boiler SO_2 Emission Limit (ANNLIM85)** --
The "allowable 1985 SO_2 emission rate," in lbs/MMBtu and rounded to four decimal places, is defined in the CAA as an annual equivalent SO_2 emission limit. ANNLIM85 is calculated using the equation:

*ANNLIM85=ANNFACT*FELIM85*.

No changes have occurred in this variable since the publication of NADBV311.

37. **First Generator heat Input at 60 Percent Capacity (HT60)** --
This field in 10^{12} Btu, is calculated on an annual basis using the formula as shown, where 5,256 is a conversion factor (60 percent of 8,760 hours/year):

*HT60=(HEATRATE*SUMNDCAP*5256)/10^9*.

The net summer capability is used because the nameplate capacity for many units is not a good measure of the maximum MW a generator can produce. most utility planners use a measure of dependable capacity such as net dependable summer capability.

One value has been changed since NADBV311 was published.

38. **Boiler Share of Generator Heat Input at 60 Percent Capacity (HT60SHR)** --
This field contains the sum of all the boiler's associated generators' HT60SHR in 10^{12} Btu. If the boiler is not

multi-headered, this value is the same as the NADBV22 HT60SHR value.

Seven values have had significant changes since the NADBV311 was published. Furthermore, some other values were also changed in the sixth decimal place to correct rounding errors in the NADBV311 PC version of the data base.

THE NADB32S FILE

There are 14 data elements in the NADBV32S file. However, only 10 of the fields are different from those in the NADB32B file. The first four fields of the NADB32S file are identical to those from the NADB32B file. This facilitates the merging of the two files into one, so that identification of the same records in the two different files can be made easily.

Descriptions of each of the 14 NADB32S data elements appear below.

1. **Boiler Sequence Number (BLRSEQ)** --
   The boiler records in this data base, NADB Version 3.2, have the same BLRSEQ numbers that were contained in NADB Version 3.11 when the NADB 3.11 boilers were sorted by State name, plant name, and boiler ID and assigned a unique sequential number from 1 to 2,913. This NADBV32 is still sorted by BLRSEQ although some state names, plant names, and boiler ID's, among other data elements, have been updated.

2. **State Name (STATNAM)** --
   This field, from Form EIA-860, contains the name of the State where the plant is located. One change has been made since the NADBV311 was published.

3. **Plant Name (PNAME)** --
   The name associated with each plant, as reported on Form EIA-860, is contained in this field. PNAMEs for planned units with identical names ("NA") but different ORIS plant codes (ORISPL) were modified by appending the ORISPL in order to uniquely identify the plants. Names changed since the NADBV311 was published have been updated.

4. **Boiler Identification Code (BLRID)** --
   This right-justified character code identifies the boiler (in the fossil-fuel steam unit case) or gas- or oil-burning turbine (in the new simple combustion turbine case). In the majority of cases, there is a 1-to-1 correspondence with generator ID. The source of the boiler identification code is Form EIA-767 or a report from the utility (if there was no Form EIA-767 filled out). If small, planned, or other units do not have an assigned boiler code, a default value of two asterisks

followed by the GENID is used. BLRIDs changed after the NADB311 was published have been updated.

5. **Generator Identification Code Multi-generator String (STRGEN)** --
This field contains the string of generator identification codes (separated by commas if there are more than one) of the generator(s) associated with the boiler.

6. **Generator Nameplate Capacity Multi-generator String (STRNMP)** --
This field contains the string of generator nameplate capacities, in MW (separated by commas if there are more than one) of the generators(s) associated with the boiler.

7. **Generator Net Dependable Capability Multi-generator String (STRSMC)** --
This field contains the string of summer net dependable capabilities, in MW (separated by commas if there are more than one) of the generators(s) associated with the boiler.

8. **Generator Month On-line Multi-generator String (STRGMN)** --
This field contains the string of generator months on-line (separated by commas if there are more than one) of the generators(s) associated with the boiler.

9. **Generator Year On-line Multi-generator String (STRGYR)** --
This field contains the string of generator years on-line (separated by commas if there are more than one) of the generators(s) associated with the boiler.

10. **Generator Outage Hours Multi-generator String (STROTG)** --
This field contains the string of outage hours, in hours (separated by commas if there are more than one) of the generators(s) associated with the boiler.

11. **Generator Heat Rate Multi-generator String (STRHTR)** --
This field contains the string of generator heat rates, in Btu/kWh (separated by commas if there are more than one) of the generators(s) associated with the boiler.

12. **Generator Generation Multi-generator String (STRGNR)** --

This field contains the string of generator generations, in GWh (separated by commas if there are more than one) of the generators(s) associated with the boiler.

13. **Generator Heat Input at 60 Percent Capacity Multi-generator String (STRH60)** --
This field contains the string of heat inputs at 60 percent capacity, in 10^{12} Btu (separated by commas if there are more than one) of the generators(s) associated with the boiler.

14. **Generator NADBV22 Sequence Number Multi-generator String (STRSEQ)** --
This field contains the string of the generator NADBV22 sequence numbers (separated by commas if there are more than one) of the generators(s) associated with the boiler.

Table 1
dBASE III Plus NADB Version 3.2 File Structure
(File: NADB32B.DBF)

Field	Name	Type	Width	Description
1	BLRSEQ	Num	4	Boiler sequence number
2	STATNAM	Char	20	State name
3	PNAME	Char	20	Plant name
4	BLRID	Char	6	Boiler identification code
5	NUMGEN	Num	4	Number of associated generators
6	UTILNAME	Char	30	Operating utility name
7	UCODE	Num	5	Operating utility code
8	EPARGN	Num	2	EPA Region
9	CNTYNAME	Char	20	County name
10	ORISPL	Num	5	DOE ORIS plant code
11	TOTALPH1	Num	9	Total basic Phase I allowances (tons) from Table A of the CAA
12	TOTHT	Num	11,6	1985 boiler total heat input (10^{12} Btu)
13	SO2	Num	10,2	1985 boiler SO_2 emissions (tons)
14	SO2CATEG	Num	2	Boiler SO_2 regulatory category (0=no information, 1=SIP, 2=NSPS D, 3=NSPS Da, 4=NSPS GG, 6=SIP for existing gas turbine, combined cycle with auxiliary firing, 9=NSPS GG for existing gas turbine, combined cycle with auxiliary firing)
15	SCRUBBER	Num	1	Boiler SO_2 scrubber flag (1=yes, 0=no, 9=no information)
16	FELIM85	Num	8,4	1985 boiler SO2 emission limit (lbs/MMBtu)
17	ANNFACT	Num	4,2	1985 SO2 emission limit annualization factor
18	AVGPD	Num	2	1985 SO2 emission limit averaging period
19	NAMECAP	Num	7,2	First generator 1989 nameplate capacity (MW)
20	SUMNDCAP	Num	7,2	First generator 1989 summer net dependable capability (MW)
21	GENMNONL	Num	2	First generator month on-line
22	GENYRONL	Num	4	First generator year on-line
23	BLRMNONL	Num	2	Boiler month on-line
24	BLRYRONL	Num	4	Boiler year on-line
25	BASE8587	Num	11,6	1985-1987 boiler average total heat input, "baseline" (10^{12} Btu)
26	BLROUTAGE	Num	6	Boiler consecutive planned and forced outage time during 1985-1987 (hours)

Table 1 continued
dBASE III Plus NADB Version 3.2 File Structure
(File: NADB32B.DBF continued)

Field	Name	Type	Width	Description
27	PRIMFUEL	Num	1	Prime fuel indicator based on greatest fuel heat share during 1985-1987 (1=coal>50%, 2=oil/gas)
28	GAS8089	Num	7,3	1980-1989 gas share for non-coal boilers (%)
29	HEATRATE	Num	8,2	First generator 1989 full load heat rate (Btu/kWh)
30	GENER	Num	8,2	First generator 1985 generation (GWh)
31	UCAPFSST	Num	8,2	Total capacity of fossil-steam units operated by the operating utility (MW)
32	MXBS8089	Num	11,6	Maximum of the average heat inputs for any combination of three consecutive years, 1980-1989, for selected units (10^{12} Btu)
33	RY_ER	Num	8,4	Representative year SO_2 emission rate (lbs/MMBtu)
34	FLAGMUNI	Num	1	Municipally operated flag (1=yes, 0=no)
35	SO2RTE	Num	8,4	1985 boiler SO_2 emission rate (lbs/MMBtu)
36	ANNLIM85	Num	8,4	1985 annualized boiler SO_2 emission limit (lbs/MMBtu)
37	HT60	Num	11,6	First generator heat input at 60 percent capacity (10^{12} Btu)
38	HT60SHR	Num	11,6	Boiler share of generator heat input at 60 percent capacity (10^{12} Btu)

Table 2
dBASE III Plus NADB Version 3.2 File Structure
(File: NADB32S.DBF)

Field	Name	Type	Width	Description
1	BLRSEQ	Num	4	Boiler sequence number
2	STATNAM	Char	20	State name
3	PNAME	Char	20	Plant name
4	BLRID	Char	6	Boiler identification code
5	STRGEN	Char	34	Generator identification code multi-generator string
6	STRNMP	Char	55	Generator nameplate capacity multi-generator string (MW)
7	STRSMC	Char	55	Generator summer net dependable capability multi-generator string (MW)
8	STRGMN	Char	20	Generator month on-line multi-generator string
9	STRGYR	Char	34	Generator year on-line multi-generator string
10	STROTG	Char	41	Generator outage hours multi-generator string (hours)
11	STRHTR	Char	41	Generator heat rate multi-generator string (Btu/kWh)
12	STRGNR	Char	55	Generator generation multi-generator string (Gwh)
13	STRH60	Char	69	Generator heat input at 60 % capacity multi-generator string (10^{12} Btu)
14	STRSEQ	Char	34	Generator NADBV22 sequence number multi-generator string

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